VOLUME 3. AIR OPERATOR TECHNICAL ADMINISTRATION

CHAPTER 7. AVIATION WEATHER INFORMATION SYSTEMS

SECTION 2. PARTS 121/135 WEATHER INFORMATION SYSTEMS

1417. REGULATORY REQUIREMENTS FOR WEATHER INFORMATION. There are many regulations and ICAO Standards and Recommended Practices which directly establish specific weather information requirements. For example, Title 14 of the Code of Federal Regulations, part 121, § 121.613 and part 135, § 135.219 both specify that weather reports or forecasts must indicate the destination airport (at time of arrival) will be at or above the authorized minimums before an instrument flight rules (IFR) flight can begin. Other regulations specify weather information requirements indirectly, even though the requirements are not specifically referenced in the CFR titles or text. In such cases an operating requirement is established which cannot be complied with unless specific weather data is available during preflight planning and while the aircraft is aloft. For example, Subpart I of both Parts 121 and 135 establish airplane performance standards. These regulations indirectly require appropriate means for determining the probable temperature, pressure altitude, and other weather factors (which will exist at the time of dispatch or flight release) necessary for calculating the aircraft's performance capabilities.

1419. GENERAL CHARACTERISTICS OF A WEATHER INFORMATION SYSTEM. Each certificate holder operating under Part 121 or Part 135 must have methods for gathering and disseminating aeronautical meteorological data. Weather information systems must rapidly disseminate accurate and complete weather information in formats that are operationally suitable for use by flightcrews, dispatchers, and other flight control personnel. All aeronautical weather systems include equipment and personnel to collect, process, and disseminate reports of weather observations and forecasts. These systems must include reliable methods for communicating weather information between appropriate ground facilities and between ground facilities and aircraft during ground and flight operations. Systems which include an approved Adverse Weather Phenomena Reporting and Forecasting subsystem must provide ground to air communications (independent of ATC) capable of keeping flightcrews informed of potentially hazardous conditions when they are identified, reported, or forecasted.

1421. WEATHER INFORMATION SYSTEMS OPERATIONAL REQUIREMENTS. A weather information system must provide at least that meteorological information needed to conduct all phases of flight operations in consideration of operational and regulatory requirements. Weather products (aviation weather information) which must be provided by a weather information system are discussed in the following paragraphs. These weather products are common to weather information systems used by both Part 121 and Part 135 operators.

1423. OPERATIONAL REQUIREMENTS - FLIGHTCREWS. Flightcrews need accurate weather information to determine the present and forecast weather conditions on any planned operation. For example, for adequate flight planning, flightcrews should know existing and expected weather conditions at the departure airport, along the planned route of flight, and at destination, alternate, and diversionary airports. While inflight, flightcrews should be able to obtain current surface weather observations and updated forecasts. When a significant change in observed weather data occurs, the location, intensity, and movement of the phenomena affecting flight operations should be updated and made available to en route aircraft.

A. Preflight Planning. Operational flight planning decisions require consideration of the following weather information:

- Terminal forecasts for departure, destination, alternate, and diversionary airports (FT)
- Winds and temperatures aloft for various route segments at planned cruising altitudes (FD)

- Surface observations for departure, destination, alternate, and diversionary airports (SA)
- NOTAMs for departure/destination/alternate/diversionary airports and navigation NOTAMs (if not provided by other means)
- Area forecasts (FA)
- Information to determine the density altitude at points of takeoff and landing
- AIRMETs, SIGMETs, Convective SIGMETs, and NCWF
- Thunderstorms (location, intensity, movement, direction, and speed)
- Squall lines located or forecast to occur along the route of flight
- Areas of heavy precipitation
- Freezing levels
- Icing (location, type, and severity)
- Turbulence (intensity, type, areas, and altitudes of occurrence)
- Hail (areas of occurrence)
- En route PIREPs
- Mountain waves (standing lenticular clouds, rotor clouds)
- Tornadoes (waterspouts, funnel clouds)
- Low level windshear

B. Inflight Weather Advisories. Inflight weather advisory requirements available from a weather information system include the following:

- Updated areas of adverse weather (such as thunderstorms, turbulence, and heavy precipitation)
- Updated reports and forecasts of winds and temperatures aloft
- Updated reports and forecasts of destination and alternate airport weather
- Reports or forecasts of unanticipated weather conditions below landing minimums at airports specified in a dispatch, flight release, or flight plan

1425. OPERATIONAL REQUIREMENTS - DISPATCH AND/OR FLIGHT CONTROL PERSONNEL. Dispatchers and other flight control personnel need current and forecast weather information to plan, control, direct, or terminate flight operations. These personnel require updated information for long term planning and for assisting crews inflight who are required to amend their flight plans due to changing weather, changing airport conditions, mechanical difficulties, or any other reason. Flight control personnel must be able to keep crews informed of reported or forecast adverse weather phenomena.

A. All weather information systems must provide flight control personnel with access to at least the meteorological information associated with the following kinds of weather products:

- Surface weather analysis and prognosis charts
- Radar summary chart
- Severe weather outlook charts
- Upper winds and temperature information
- Weather depiction charts
- Freezing level charts
- Terminal and area forecasts
- Aviation weather observations (surface reports)
- Pilot weather reports
- Hazardous weather reports and depiction charts
- Weather advisories (such as convective SIGMETs, SIGMETs, AIRMETs, and CWAs)

B. Weather information systems which support flight operations above 18,000 feet must provide the following additional information:

- High level severe weather information (clear air turbulence)
- Tropopause height information
- Vertical windshear information
- Constant pressure charts
- Constant pressure analysis charts (5 levels)
- High level (400 - 70 millibar) significant weather prognosis

1427. ADVERSE WEATHER PHENOMENA REPORTING AND FORECASTING REQUIREMENTS. Any weather information system used in domestic or flag operations under Part 121 must include an Adverse Weather Phenomena Reporting and Forecasting subsystem. Section 121.101(d) requires only those operators which conduct domestic and/or flag operations to have FAA approved Adverse Weather Phenomena Reporting and Forecasting subsystems. These subsystems allow

certificate holders to monitor weather reports from various sources in their operating to quickly and accurately identify adverse weather phenomena, and to predict their effects on safety of flight and ground operations. These subsystems must include forecasting abilities which are at least equal in capability to government weather system forecasting abilities and which are specifically oriented to the certificate holder's operational needs with respect to adverse weather phenomena.

A. Adverse Weather Phenomena. Adverse weather phenomena are meteorological conditions which, if encountered inflight or during ground operations, could directly diminish safety of an operation. The following meteorological conditions are considered by the FAA to be adverse weather phenomena:

- Strong surface winds (exceeding 30 knots)
- Widespread low ceilings and/or visibilities which affect selection of destination and alternate airports
- Active thunderstorms (particularly those with increasing VIP levels)
- Moderate or severe inflight icing
- Icing which affects ground operations (including snow, freezing rain or drizzle, ice fog, or sleet)
- Severe or extreme turbulence (including clear air and mountain wave)
- Low altitude windshear (below 2000 feet AGL)
- Occurrence of unforecast weather conditions below landing or takeoff minimums
- Volcanic ash
- Sandstorms and duststorms
- Meteorological conditions which contaminate a runway surface and adversely affect aircraft performance or prohibit use of a runway

B. Capabilities of Adverse Weather Phenomena Reporting and Forecasting Subsystems. Adverse Weather Phenomena Reporting and Forecasting subsystems must meet all the following criteria:

- Provide direct access to sources of weather information capable of identifying, reporting, and forecasting adverse weather phenomena which could directly diminish the safety of a scheduled flight or ground operation
- Incorporate methods to modify forecasts of adverse weather phenomena when reports indicate adverse weather of different severity than originally forecast
- Contain methods and procedures to collect and evaluate adverse weather information
- Use effective and timely methods to disseminate the potential effects of adverse weather to flightcrews and other company personnel responsible for operational control functions
- Incorporate methods for describing the location of adverse weather phenomena with reference to navigational fixes or locations (the fixes or locations should be displayed on navigation charts, weather plotting charts, other inflight operational charts or displays normally used during the certificate holder's en route operations)
- Incorporate methods for suspending, restricting, or modifying (as necessary) flight operations affected by adverse weather
- Provide continuous and direct on duty participation of a certificated dispatcher or aviation meteorologist
- Use pilot/dispatcher communications which meet at least the regulatory requirements applicable to Part 121 domestic and flag operations

1429. APPROVAL OF ADVERSE WEATHER PHENOMENA REPORTING AND FORECASTING SUBSYSTEMS AND QUALIFIED PUBLIC INTERNET COMMUNICATIONS PROVIDERS.

A. Requests for Approval. All Adverse Weather Phenomena Reporting and Forecasting subsystems must be FAA approved. An operator required to use an approved Adverse Weather Phenomena Reporting and Forecasting subsystem must make a written request for approval. The initial request must describe the planned subsystem in sufficient detail for the POI to evaluate the proposal. This request must be accompanied by proposed manual materials, details of any contractual arrangements, and resumes of key personnel used in the subsystem or employed by any commercial weather service involved.

B. Evaluations and Inspections of Adverse Weather Phenomena Reporting and Forecasting Subsystems. Before approving a subsystem, a POI must evaluate

the submitted material with the request for approval and conduct inspections of the facilities, equipment, and other components. The POI must also verify the professional qualifications and training of meteorologists and dispatchers who will be used in the Adverse Weather Phenomena Reporting and Forecasting subsystem. When a POI has determined the proposed subsystem complies with the criteria specified in paragraph 1427, the subsystem may be approved.

C. Approval or Denial of Adverse Weather Phenomena Reporting and Forecasting Subsystems.

(1) Approval for a certificate holder to use an Adverse Weather Phenomena Reporting and Forecasting subsystem shall be accomplished by issuing operations specification (OpSpec) A010 with a description of the subsystem or reference to the certificate holder's manual. Any proposed revisions to the subsystem, including manual material, should be evaluated and inspected by the FAA as soon as possible.

(2) If after evaluation and inspection, a POI determines a proposed Adverse Weather Phenomena Reporting and Forecasting subsystem does not meet the requirements of this handbook, all submitted materials shall be returned to the operator with an explanatory letter. This letter must clearly state why the proposed subsystem was not approved. If at anytime after a subsystem has been approved, a POI determines it does not continue to meet the requirements of this handbook, the POI shall immediately inform the certificate holder. If the certificate holder does not take immediate and appropriate corrective action, the POI must take action to amend OpSpec A010 and rescind approval of the Adverse Weather Phenomena Reporting and Forecasting Subsystem.

1431. SPECIAL OPERATIONAL REQUIREMENTS. Weather information systems must accommodate any special operational needs a certificate holder may have because of the type of operations, the aircraft used in operations, or environmental conditions in the operating area.

A. International Flight. Transoceanic flight planning and other long range operations require precise navigational capabilities. The precision of the navigational capabilities is a direct result of careful preparation using the most current weather information available. Forecasts used for long range flight planning should include forecasts of winds and temperatures aloft for 500 mb, 300 mb, 250 mb, 200 mb, and 150 mb (as applicable), tropopause height information, and significant en route weather phenomena. This information should cover the intended flight operations with regard to time, altitude, and geography. SIGMET information should be provided regarding active or expected thunderstorms, widespread lines of cumulonimbus (Cb) clouds, and Cb embedded in cloud layers or concealed by haze. In addition to the weather information required for domestic flight, the following weather information is specifically required by ICAO procedures for international flight:

(1) At cruising levels below FL 450: Active thunderstorms:

- Tropical cyclones
- Severe squall lines
- Hail
- Severe turbulence
- Severe icing
- Mountain waves
- Standing lenticular clouds

(2) At cruising levels above FL 450:

- Moderate or severe turbulence
- Cumulonimbus clouds
- Hail

B. Helicopter Remote Site Operations. Helicopter operations at remote sites may require special meteorological information. The extent of special weather information needed for a particular operation depends on the type of operation and the operating environment. High density altitudes, high winds, and icing conditions can be critical factors in helicopter operations, particularly when helicopters are required to hover out of ground effect or to make downwind or crosswind takeoffs or landings. In addition to weather information ordinarily required for helicopter operations, the following weather information is required for remote site operations:

(1) High elevation operating sites:

- Mountain waves
- Low level windshear
- Strong surface winds (20 knots or greater)
- Moderate turbulence
- Surface temperature (for density altitude computations)

(2) Offshore operations:

- Wave height (for single engine operations or IFR helicopter operations using airborne radar approach (ARA) procedures or offshore standard approach procedures (OSAP)
- Strong surface winds (20 knots or greater)
- Fog conditions

1432-1434. RESERVED.

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